MATERIAL SAFETY DATA SHEET

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
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SRM Number: 983
MSDS Number: 983
SRM Name: Radiogenic Lead Isotopic Standard

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SECTION I. MATERIAL IDENTIFICATION

Material Name: Radiogenic Lead Isotopic Standard

Description: SRM 983 consists of 1 g of wire that was prepared from radiogenic lead. It is chemically pure to at least 99.9 + % purity.

The Isotopic Compositions

Atomic Abundance Ratio (Lead-204/Lead-206)	0.000 371	±	0.000 020
Atomic Abundance Ratio (Lead-207/Lead-206)	0.071 201	±	0.000 40
Atomic Abundance Ratio (Lead-208/Lead-206)	0.013 619	±	0.000 024
Lead-204 (atom %)	0.034 2	±	0.002 0
Lead-206 (atom %)	92.149 7	±	0.004 1
Lead-207 (atom %)	6.561 1	±	0.002 5
Lead-208 (atom %)	1.255 0	±	0.002 2

Other Designations: **Lead** (plumbum)

Name	Chemical Formula	CAS Registry Number
Lead	Pb	7439-92-1

SRM 983 IS A RADIOACTIVE MATERIAL CONTAINING 2.6 X 10^4 BQ/G LEAD-210 OF NATURAL ORIGIN. THE HAZARD INFORMATION SUPPLIED IN THIS MSDS IS FOR THE CHEMICAL HAZARD ONLY. FOR THE "REPORT OF TEST" CONCERNING THE RADIOACTIVE MATERIAL, REFER TO THE SRM CERTIFICATE. ALL USERS AND PURCHASERS MUST COMPLY WITH ALL STATE AND FEDERAL REGULATIONS REGARDING THE HANDLING, USE, AND DISPOSAL OF THIS MATERIAL.

DOT Classification: Limited Quantity Radioactive Material, UN2910.

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Component	Purity (%)	Exposure Limits and Toxicity Data
Lead	≈100	ACGIH TWA: 0.05 mg/m^3[(a)]
		OSHA TWA: 50 µg/m^3 (8 h)[(a)]
		OSHA Action Level (AL): 30 µg/m^3 (8 h) [(a)]
		NIOSH recommended TWA: 0.1 mg/m^3 (10 h)[(a)]
		Human, Inhalation TC_{Lo}: 10 µg/m^3
		Rat, Intraperitoneal LD_{Lo}: 1 g/kg
		Woman, Oral TD_{LO}: 450 mg/kg/6 years

[(a)]For lead, inorganic fumes, and dust.

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Lead
Appearance: White to gray solid.
Relative Atomic Mass: 206.064 6[(a)]
Boiling Point: 1740 °C
Melting Point: 328 °C
Density: 11.3 g/cm^3
Solubility in Water: Almost insoluble.
Solvent Solubility: Soluble in nitric acid and hot sulfuric acid.

[(a)] The atomic mass of the material is calculated to be 206.942 9 using the nuclidic masses 203.973 044, 205.974 468, 206.975 903, and 207.976 650.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not applicable. **Method Used:** Not applicable.

Autoignition Temperature: Not applicable.

Flammability Limits in Air (Volume %): **UPPER:** Not applicable.
LOWER: Not applicable.

Unusual Fire and Explosion Hazards: Lead is a negligible fire and explosion hazard in bulk form when exposed to heat or flames. Dust/air mixtures may ignite or explode.

Extinguishing Media: Use extinguishing media that is appropriate to the surrounding fire. Use dry powder for metal fires, dry sand, graphite, soda ash, or sodium chloride.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing. Cool containers with water spray until well after the fire is out.

SECTION V. REACTIVITY DATA

Stability: **X** **Stable** ____ **Unstable**

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid contact with incompatible materials.

Incompatibility (Materials to Avoid): Lead is incompatible with oxidizing materials, halogens, combustible materials, peroxides, metals, metal carbides, and acids.

See Section IV: "Unusual Fire and Explosion Hazards".

Hazardous Decomposition or Byproducts: Thermal decomposition of lead may produce toxic lead oxides.

Hazardous Polymerization: ____ **Will Occur** **X** **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: **X** **Inhalation** **X** **Skin** **X** **Ingestion**

Health Hazards (Acute and Chronic): This material may be harmful by inhalation or ingestion, and may be irritating to the mucous membranes, upper respiratory tract, and skin. Lead may have reproductive effects or cause birth defects. It is also suspected as a carcinogen in animals. Absorption of large amounts of lead may cause a metallic taste, thirst, a burning sensation in the mouth and throat, salivation, abdominal pain with severe colic, vomiting, diarrhea of black or bloody stool, fatigue, sleep disturbances, memory loss, loss of concentration, and muscle pain and weakness. Metal fume fever (an influenza-like illness), due to inhalation of freshly formed metal oxide particles below 1.5 µm, may occur. Symptoms may include an initial onset of thirst with a sweet, metallic or foul taste in the mouth. Other

symptoms may include upper reparatory tract irritation, fever, chills, muscular pain, headache, nausea, profuse sweating, excessive urination, and diarrhea. Metal fume fever symptoms usually subside within 24 hours to 36 hours.

Medical Conditions Generally Aggravated by Exposure: Blood system disorders. Gastrointestinal disorders. Nervous system disorders. Respiratory disorders.

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs	X[(a)]	
By the Occupational Safety and Health Administration (OSHA)		X

[(a)]The IARC classifies lead and inorganic lead compounds as Group 2B, *Possibly Carcinogenic to Humans*.

Emergency and First Aid Procedures:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If the victim is not breathing, give artificial respiration by qualified personnel. Obtain medical assistance if necessary.

Ingestion: If a large amount is ingested, obtain medical assistance immediately.

Target Organ(s) of Attack: Nervous system. Kidneys.

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Place the material into an appropriate labeled container suitable for eventual disposal. Keep out of water supplies and sewers. California Proposition 65, Safe Drinking Water and Toxic Enforcement Act of 1986, states that the product contains a chemical known to the state of California to cause cancer and reproductive toxicity. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 103, has notification requirements for releases or spills to the environment greater than or equal to the Reportable Quantity (RQ) of 4.54 kg (10 pounds) lead for solid metal particles < 100 micrometer diameter (0.004 inches) (also listed under 40 CFR 302.4, Appendix A).

Waste Disposal: Follow all federal, state, and local laws governing disposal. Dispose of in accordance with EPA 40 CFR 262 Hazardous Waste Number D008 if the waste produces an extract containing a maximum concentration for the toxicity characteristic of 5 mg/L of lead contaminant.

Handling and Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible materials. Provide approved respiratory apparatus for non-routine or emergency use. Wear gloves and chemical safety glasses where contact may occur. An eye wash station and washing facilities should be readily available near handling and use areas.

> **NOTE:** Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Lead*, 18 March 2004.
The Merck Index, 11th Ed., 1989.
The Sigma Aldrich Library of Chemical Safety Data, Ed. II, 1988.